


Education Quality and Accountability Office
EQAO

Understanding the Grade 9 EQAO Assessment of Mathematics

Mathematics Professional Learning Menu

March 30, 2011

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Agenda

- Welcome and Introductions
- Anticipation Guide
- Overview of the Grade 9 EQAO Assessment
- Break
- Introduction to Range-Finding
- Lunch
- Range Finding Activity
- Sharing of Results from Range-Finding Activity
- EQAO Resource Bank
- Homework Helper Presentation: Sam Mercurio
- Wrap-up / Exit Ticket / Dismissal

Learning Goals

- To better understand how the Grade 9 EQAO assessments of mathematics are constructed and scored
- To learn ways to prepare grade 9 students for success on the EQAO assessments of mathematics
- To share promising EQAO practices and to dialogue with colleagues in order to improve EQAO scores as outlined in the Catholic Board Learning Plan.

Catholic Board Learning Plan (CBLP) 2010-2013

SMART Goal: Increasing student achievement on EQAO assessments (3, 6 & 9) by 5% by 2013

Foundational Principles:

Ontario Curriculum and ministry support documents are the primary sources for all mathematics instruction.

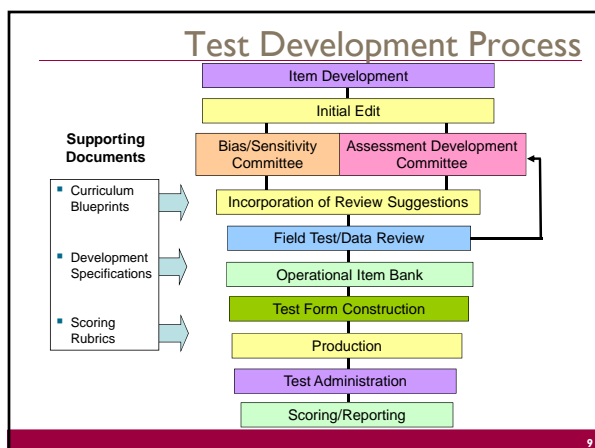
The mathematical processes described in the Ontario Curriculum are used throughout all mathematics instruction.

A minimum of 60 minutes is provided daily for mathematical instruction.

The diverse learning needs of EACH student are supported by mathematical instruction, assessment and evaluation that are varied in nature and provide multiple opportunities to demonstrate learning.


The comprehensive list of strategies that relate to effective mathematics instruction are used regularly.

Expected Practice: By June 2013, all mathematics instruction will be delivered using a 3-part lesson model



Test Development Process

All questions (items) are developed by Ontario teachers



Linking EQAO Data to The Ontario Curriculum

Framework Documents:



The assessment frameworks:

- Provide a detailed description of the assessments':
 - Purpose and benefits
 - Large scale vs. classroom
 - What is reported
 - Make-up of assessments
 - Curriculum connections
 - Description of scoring
 - Comparability
- Download from www.eqao.com

Large-Scale Assessment

A Value-Added Resource

Serving Different Purposes

Large-Scale Assessment

Purpose – to provide comparable year-to-year data
Data informs improvement planning and target setting
Created and scored “at a distance”

Presents a snapshot of student achievement (summative)

Administered, scored and reported in a consistent and standard manner

Provides the same items for all students

Classroom Assessment

Purpose - to reports regularly on student achievement
Data provides students with info for self-evaluation and goal setting

Created and marked by the classroom teacher

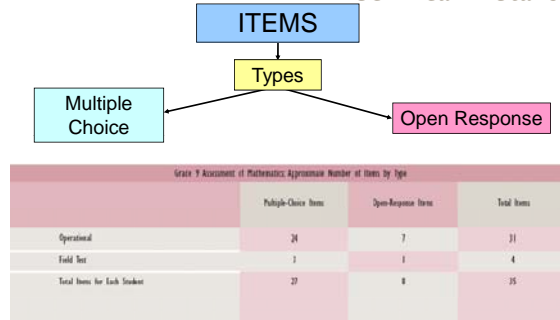
Administered at regular intervals over time (diagnostic, formative, summative)

Involves a variety of supports, variation in administration procedures and time allowed, and teacher autonomy in marking

Allows for modified items and tasks tailored to needs of individual or groups of students

Grade 9 Assessments of Mathematics

Technical Details



Sample from the Grade 9 Applied Blueprint

Number	Grade 9 Applied Mathematics Expectations	MC Total = 24 OR Total = 7	Raw Score Points
NAB.02	Number Sense and Algebra, Overall Expectation 2 simplify numerical and polynomial expressions in one variable, and solve single first-degree equations		
	Number Sense and Algebra, Specific Expectations for Overall 2: <i>Simplifying Expressions and Solving Equations</i>		
NAB.01	simplify numerical expressions involving integers and rational numbers, with and without the use of technology		
NAB.02	relate their understanding of inverse operations to squaring and taking the square root, and apply inverse operations to simplify expressions and solve equations		
NAB.03	describe the relationship between the algebraic and geometric representations of a single-variable term up to degree three (e.g., length, which is one dimensional, can be represented by x ; area, which is two dimensional, can be represented by x^2 or x^2 ; volume, which is three dimensional, can be represented by $(x)(x)(x)$, $(x^2)(x)$, or x^3)		
NAB.04	substitute into and evaluate algebraic expressions involving exponents (i.e., evaluate expressions involving natural-number exponents with rational-number bases (e.g., evaluate 2^3 by hand and 9.8^2 by using a calculator)) (Sample problem: A movie theatre wants to compare the volume of popcorn in two containers, a cube with edge length 8.1 cm and a cylinder with radius 4.5 cm and height 8.0 cm. Which container holds more popcorn?)		
NAB.05	add and subtract polynomials involving the same variable up to degree three (e.g., $(2x + 1) + (x^2 - 3x + 4)$), using a variety of tools (e.g., algebra tiles, computer algebra systems, paper and pencil)		
NAB.06	multiply a polynomial by a monomial involving the same variable to give results up to degree three (e.g., $(2x + 1)(x^2 + 3x + 1)$), using a variety of tools (e.g., algebra tiles, drawings, computer algebra systems, paper and pencil)		
NAB.07	solve first-degree equations with nonfractional coefficients, using a variety of tools (e.g., computer algebra systems, paper and pencil) and strategies (e.g., the balance analogy, algebraic rearrangement) (Sample problem: Solve $2x + 7 = 4x - 1$ using the balance analogy.)		
NAB.08	substitute into algebraic equations and solve for one variable in the first degree (e.g., in relationships, in measurement) (Sample problem: The perimeter of a rectangle can be represented as $P = 2l + 2w$. If the perimeter of a rectangle is 58 cm and the width is 12 cm, determine the length.)		



Italicized Expectations

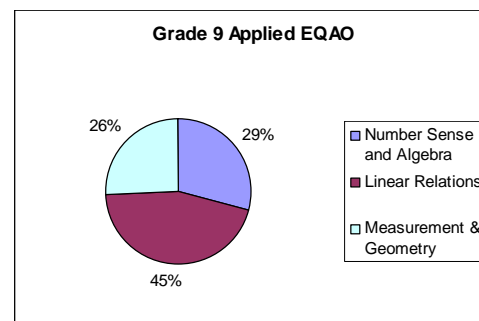
Expectations in *italics* cannot be appropriately assessed on a large scale assessment.

Students will:

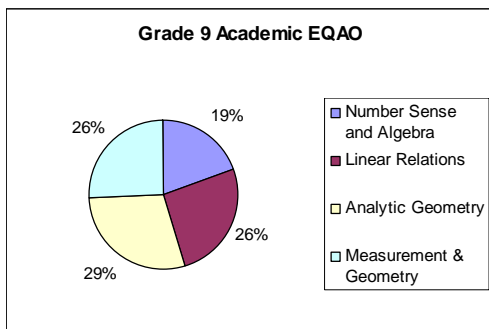
LR2.01 construct tables of values, graphs, and equations, *using a variety of tools* (e.g., graphing calculators, spreadsheets, graphing software, paper and pencil), to represent linear relations derived from descriptions of realistic situations (Sample problem: Construct a table of values, a graph, and an equation to represent a monthly cellphone plan that costs \$25, plus \$0.10 per minute of airtime.)

LR1.03 design and carry out an investigation or experiment involving relationships between two variables, including the collection and organization of data, using appropriate methods, equipment, and/or technology (e.g., surveying; using measuring tools, scientific probes, the Internet) and techniques (e.g., making tables, drawing graphs) (Sample problem: Design and perform an experiment to measure and record the temperature of ice water in a plastic cup and ice water in a thermal mug over a 30 min period, for the purpose of comparison. What factors might affect the outcome of this experiment? How could you design the experiment to account for them?)

EQAO Strand Percentages



EQAO Strand Percentages



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Levels of Difficulty and MC

Multiple-choice questions are developed and used to distinguish performance levels.

- **Easy:** distinguish between Level 1 and 2 performances.
- **Medium:** distinguish between Level 2 and 3 performances.
- **Challenging:** distinguish between Level 3 and 4 performances.



Categories of the Achievement Chart

Knowledge and Understanding - KU

These items require students to demonstrate:

- subject specific content (knowledge)
- the comprehension of its meaning and significance (understanding)

e.g. use the Pythagorean Theorem to find the length of the missing side.



Categories of the Achievement Chart

Thinking - PS

These items require students to:

- select and sequence a variety of tools to solve a problem
- demonstrate a critical-thinking process.

To answer the question, students need to make a plan.



Categories of the Achievement Chart

Application - AP

These items require students to:

- select the appropriate "tool" or get the necessary information
- "fit" it to the problem.

E.g. Determine the amount of soup the cylindrical can contains.



The Achievement Chart

Levels of Achievement

Level 4: thorough/high degree

Level 3: considerable

Level 2: some

Level 1: limited



Generic Rubric: Mathematics Open-Response Items	
Code	Descriptor
10	<ul style="list-style-type: none"> demonstration of limited understanding of concepts and/or procedures application of knowledge and skills shows limited effectiveness due to <ul style="list-style-type: none"> misunderstanding of concepts incorrect selection or misuse of procedures problem-solving process shows limited effectiveness due to <ul style="list-style-type: none"> minimal evidence of a solution process limited identification of important elements of the problem too much emphasis on unimportant elements of the problem no conclusions presented conclusion presented without supporting evidence
20	<ul style="list-style-type: none"> demonstration of some understanding of concepts and/or procedures application of knowledge and skills shows some effectiveness due to <ul style="list-style-type: none"> partial understanding of the concepts errors and/or omissions in the application of the procedures problem-solving process shows some effectiveness due to an incomplete solution process <ul style="list-style-type: none"> identification of some of the important elements of the problem some understanding of the relationships between important elements of the problem simple conclusions with little supporting evidence
30	<ul style="list-style-type: none"> demonstration of considerable understanding of concepts and/or procedures application of knowledge and skills shows considerable effectiveness due to <ul style="list-style-type: none"> an understanding of most of the concepts in spite of minor errors and/or omissions in the application of the procedures problem-solving process shows considerable effectiveness due to <ul style="list-style-type: none"> a solution process that is nearly complete identification of most of the important elements of the problem a considerable understanding of the relationships between important elements of the problem appropriate conclusions with supporting evidence
40	<ul style="list-style-type: none"> demonstration of thorough understanding of concepts and/or procedures application of knowledge and skills shows a high degree of effectiveness due to <ul style="list-style-type: none"> a thorough understanding of the concepts an accurate application of the procedures (any minor errors and/or omissions do not detract from the demonstration of a thorough understanding) problem-solving process shows a high degree of effectiveness due to <ul style="list-style-type: none"> a complete solution process identification of all important elements of the problem a thorough understanding of the relationships between all of the important elements of the problem appropriate conclusions with thorough and insightful supporting evidence

EQAO Website
www.eqao.com

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With Learning in Mind

Office de la qualité et de la responsabilité en éducation

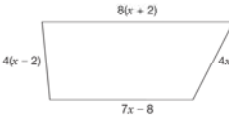


Axé sur l'apprentissage

Field Maintenance

Field Maintenance

A field in the shape of a trapezoid has a perimeter of 460 m. A fence is being built along the field's perimeter.



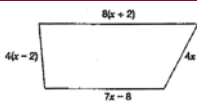
Determine the length of fencing needed for each side of the field.
Show your work.

Clarence's Quandary

Clarence's Quandary

Clarence works at a veterinarian's office. He needs to give a dose of medicine to a 24 kg dog. The recommended dosage for a dog that weighs 10 kg is 25 mL. Determine the dose Clarence should give to the 24 kg dog if the rate remains the same. Show your work.

Field Maintenance Code 10 Anchor



Determine the length of fencing needed for each side of the field.
Show your work.

Student demonstrates a misuse of procedures; incorrect development of algebraic equation with several errors.

$$\begin{aligned}
 &4x - 2 + 7x - 8 + 4x + 8x + 2 \\
 &= 4x - 2 + 7x - 8 + 4x + 8x + 2 \\
 &= 4x + 7x + 4x + 8x = 2 + 8 + 2 \\
 &= 23x = 12 \\
 &\therefore \frac{23x}{23} = \frac{12}{23} = 1.92
 \end{aligned}$$

Detailed Procedure:

- Each group will form two pairs. One pair will examine Field Maintenance and the other will examine Clarence's Quandary. Review the rubric.
- Each pair will pick **two** student samples of each code (10, 20, 30 & 40) to be used as anchors. Reasons must be annotated on each anchor.
- Each pair then must share their anchors with the other pair in the group. **All** group members must agree on **one** anchor for each code (10, 20, 30 & 40).
- Your table will have 8 annotated anchors. Four for each task.
- Post your anchors.

EQAO Resource Bank

Instructions to access the EQAO RESOURCE BANK:

1. Open your web browser
2. Type "[FYI](#)" as your web address
3. Click on "**Document Library**" at the top left side of the page
4. Click on "**Numeracy**"
5. Click on "**Intermediate Math**"
6. Click on "**EQAO RESOURCE BANK**"
7. Open the help file and follow the instructions

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Wrap Up

- Complete the "After" column of your Anticipation Guide
- Questions? Comments?
- **Think / Pair / Share**
 - What effective strategies have you used to prepare your students for EQAO?
- The materials from today's session will be posted on the wiki:
<http://dpcdsb-eqao.wikispaces.com/Preparation+Resources>
- Questions? Comments?

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Contact Information

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